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ATARI®

# Basic Arithmetic

# BASIC ARITHMETIC

## Version 1

## TABLE OF CONTENTS

# INTRODUCTION

This module, Basic Arithmetic, has been developed by MECC Instructional Services. The module consists of this manual and a diskette containing six computer programs that provide practice in arithmetic skills. The programs were designed for use at the elementary level but could also provide remedial work for older students. None of these programs is a tutorial. They all require that students understand the concepts involved prior to using the program.

BASE TEN, MATH GAME, and SPEED DRILL provide practice on basic arithmetic operations. BASE TEN drills on multiplication of multiples of ten and decimals as well as basic multiplication facts. MATH GAME and SPEED DRILL provide exercises in all four arithmetic operations with whole numbers.

ROUND and ESTIMATE involve rounding whole numbers and using rounded numbers to estimate answers to arithmetic exercises. ESTIMATE includes problems using percent.

CHANGE allows the student to role play a cashier and practice giving correct change.

Two programs, BASE TEN and SPEED DRILL, have teacher options, which are accessed by typing Control A (i.e., simultaneously pressing both the CTRL and the A keys) from the menu. A description of the teacher option and instructions for its use are included in the Background Information for each program.

Handout pages in this manual may be duplicated for use with students. These pages are numbered sequentially in the upper right corner, for example, handout i - Name of Handout.

Code numbers following some objectives refer to sections in Some Essential ___ ___es (SELOs), produced by the Minnesota State Department of ___ The SELOs cited in this manual are from Some Essential Learner ___tcomes In Mathematics.

# INDEX TO PROGRAMS ON DISKETTE

## BASE TEN

a timed drill in game format on multiplying whole numbers 0-9, multiples of ten, or decimals. A teacher option is available.

## CHANGE

a drill on making change when given a purchase price and the amount paid.

## ESTIMATE

a timed drill on estimating answers to addition, subtraction, multiplication, division and percent exercises using whole numbers.

## MATH GAME

a drill in a contest format on the four basic operations using whole numbers with consideration of age and ability.

## ROUND

a drill on rounding whole numbers to the nearest ten, hundred, or thousand.

## SPEED DRILL

a timed drill on the four basic operations using whole numbers with difficulty level determined by the teacher. A teacher option is available.

## MULTIPLICATION PRACTICE

Specific Topic:    Multiplication

Type:    Drill and Practice

Reading Level:    2.9 (Spache)

Grade Level:    3-6

## DESCRIPTION...

BASE TEN provides a timed drill in a game format.  The choice of multiplication exercises includes whole numbers (0-9), multiples of ten, and decimals.  The teacher selects the type of problems and the time limit by using a Teacher Option.

## OBJECTIVES...

1.    to recall the basic facts of multiplication (Mathematics SELO I-A-2).

2.    to compute using whole numbers less than 10,000 (Mathematics SELO II-A-1).

3.    to perform basic operations using decimals (Mathematics SELO II-A-2).

4.    to mentally multiply and divide by 10, 100, 1000 (Mathematics SELO II-A-5).

5.    to enjoy doing mathematics at ability level (Mathematics SELO V-A-3).

6.    to use map directions in planning a course.

## BACKGROUND INFORMATION...

BASE TEN provides three different types of timed multiplication drills in a game format. The students move a spaceship from the starting point toward Base Ten through a random assortment of obstacles on a galactic chart. The spaceship moves when the student correctly answers a multiplication problem within the time limit.

At the beginning of the game, the spaceship is located in the lower left corner of the playing field. Base Ten is in the lower right corner.

The obstacles include:

Black holes
Danger zones

Vapor clouds
Asteroids

There is always a clear, direct path to Base Ten around the outside of the playing field. Other paths may be shorter but will contain obstacles.

Each obstacle produces a different result based on an assigned probability.

| obstacles | results |
|---|---|
| Black Holes | 90% chance ship transported to new location |
| | 10% chance ship destroyed |
| Danger Zones | 100% chance ship destroyed |
| Vapor Clouds | 50% chance lost in vapor cloud, must do more problems to get ship released |
| | 50% chance pass through safely |
| Asteroids | 50% chance caught in asteroids, must do more problems |
| | 40% chance pass through safely |
| | 10% chance ship destroyed |

The movement of the spaceship is determined by what direction the students choose, how long it takes to answer the problem, and whether the answer is correct.

Before each turn, the students specify the direction in which they want the ship to move. In this way the program reinforces the students' knowledge of the four map directions (north, south, east and west).

The faster the students answer the multiplication problem, the farther the spaceship will travel. The maximum distance on one turn is four squares.

## BACKGROUND INFORMATION (continued)

Students who don't answer within the time limit or who answer incorrectly have a second chance. If the second answer is correct, the spaceship remains in the same place. If the second answer is wrong, the spaceship moves backwards, and two turns are added to the score.

If on the first problem both answers are incorrect, the ship remains blocked at the starting point.

When the ship hits the boundary of the playing field or a blocking obstacle, it is blocked and that turn is over. The program ends when either the ship is destroyed or the ship reaches Base Ten.

If the ship reaches Base Ten, the player's name is entered, and the list of "Base Ten Top Officers" is shown. This contains the names and scores of the students who reached Base Ten in the smallest number of turns. If the current player has a lower score than those on the list, the new name and score are entered into the list, and those officers with higher scores move down on the list. The students' names remain on the diskette and are shown after each use of the program. The list may be erased by using the Teacher Option.

Since the ship's movement depends on the time limit allowed, the time limit for each problem should be geared to the particular type of problem, as well as the individual student. The basic facts problems probably require less time (perhaps 10 to 15 seconds) than do the other types. The decimal problems require a longer time limit, perhaps 30 seconds or more. The time limit and the type of problem are specified by the teacher in the Teacher Option described on the next page.

This program makes extensive use of sound. The teacher may wish to adjust the volume control on the television depending on the location of the computer, i.e., in a classroom, a media center, or a computer lab.

## BACKGROUND INFORMATION (continued)

Teacher Option

A teacher option allows the teacher to delete the names listed as "Top Officers" at the end of the game and to determine the type of problems and the time limit.

To use the Teacher Option, follow the steps outlined below:

a.  Be certain the diskette does not have a write-protect sticker.  When the menu appears on the screen, type Control A (i.,e., hold down the CTRL key while you type an A).  The title "Teacher Options" will appear.

b.  Select the BASE TEN option.

c.  Choose one of the options listed on the screen:
    1.  See the file of student names and scores
    2.  Clear the file of student names and scores
    3.  See the current time limit and type of problems
    4.  Change the time limit and type of problems
    5.  Return to menu

d.  Option 1:    See the file of names and scores.  This option allows you to see the current list of "Base Ten Top Officers" that is shown at the end of the game.

e.  Option 2:    Clear the file of names and scores.   After this option is selected, the disk drive will operate for a short time, then the message "The file has been cleared" will appear.  This means that the file (or list) of the names of the highest scoring students is erased, so that a new group of students can try for the highest scores.

f.  Option 3:    See the current time limit and type of problems.  This option allows you to see the type of problems and time limit currently being used in BASE TEN.

g.  Option 4:  Change the time limit and type of problems.  When this option is selected, the following question appears:
    Would you like multiplication with
        1.  Basic facts
        2.  Multiples of ten
        3.  Decimals

Basic facts are problems using whole numbers from 0 through 9, such as 6 x 7.  Multiples of ten use numbers that are the product of a single digit and a postive power of ten, such as 80 x 700.  The decimal problems involve the product of a single digit and a negative power of ten, such as .06 x .4 .

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## BACKGROUND INFORMATION (continued)

Type the number of the kind of problems desired, then press RETURN.

Next the question is asked:

How many seconds would you like to allow for each problem?

Allow a longer response time for the more difficult problems. Consider the students' abilities and the time required to enter the answer at the keyboard. For example, basic facts might use 10-20 seconds, multiples of ten 20-30 seconds, and decimals 30 or more seconds.

Type in a number and press RETURN.

The disk drive will operate briefly, then the message appears:

Your selections have been recorded.

This means that your choices for type of problem and time limit have been recorded on the diskette. The program BASE TEN will use only that type of problem and that time limit until the Teacher Option is used again to change them.

## USE IN AN INSTRUCTIONAL SETTING...

### Preparation

Students should already know the concepts and multiplication methods needed for the type of problems they will work with. They should know the process well enough to be able to answer within the given time limit.

When using BASE TEN to practice multiplication of basic facts, students should understand multiplication as repeated addition and should be in the process of memorizing the basic facts.

When using BASE TEN to practice multiplying multiples of ten, students should understand place value and the effect of multiplying by ten (adding a zero on the right of the given number).

When using BASE TEN to practice multiplying decimals, students must understand the meaning of decimal notation and have experience in correctly placing the decimal point in the answers to multiplication problems.

### Using the Program

BASE TEN was designed for use by individual students. Be certain that the students can successfully answer the problems within the time limit a large percentage of the time, so that they will not become discouraged. Consider the time necessary to enter the numbers from the keyboard after the answer is known.

The game is designed to encourage students to encounter some obstacles. In this way, students will work more multiplication problems than are necessary to reach Base Ten in the minimal number of turns. If students choose a path that follows the perimeter of the playing field, they will not encounter any obstacles. However, the shortest path to Base Ten may involve entering a Black Hole and risking being tranported forward or being destroyed.

Handout 1 - BASE TEN Score Sheet can be used to record students' scores. The list of Base Ten Top Officers appearing at the end of the program might be posted in the classroom as a motivational device.

# BASE TEN SCORE SHEET

Name _____

Type of Multiplication:  Basic Facts  -  Multiples of 10  -  Decimals
   (circle one)

Date _____         Score _____

Result:   Ship landed at Base Ten   _____
          Ship was destroyed         _____

---

Type of Multiplication:  Basic Facts  -  Multiples of 10  -  Decimals
   (circle one)

Date _____         Score _____

Result:   Ship landed at Base Ten   _____
          Ship was destroyed         _____

---

Type of Multiplication:  Basic Facts  -  Multiples of 10  -  Decimals
   (circle one)

Date _____         Score _____

Result:   Ship landed at Base Ten   _____
          Ship was destroyed         _____

---

Type of Multiplication:  Basic Facts  -  Multiples of 10  -  Decimals
   (circle one)

Date _____         Score _____

Result:   Ship landed at Base Ten   _____
          Ship was destroyed         _____

---

Type of Multiplication:  Basic Facts  -  Multiples of 10  -  Decimals
   (circle one)

Date _____         Score _____

Result:   Ship landed at Base Ten   _____
          Ship was destroyed         _____

MECC

Students try to guide the spaceship from the starting point to land at Base Ten by correctly answering multiplication problems.

EXAMPLES OF SCREEN OUTPUT
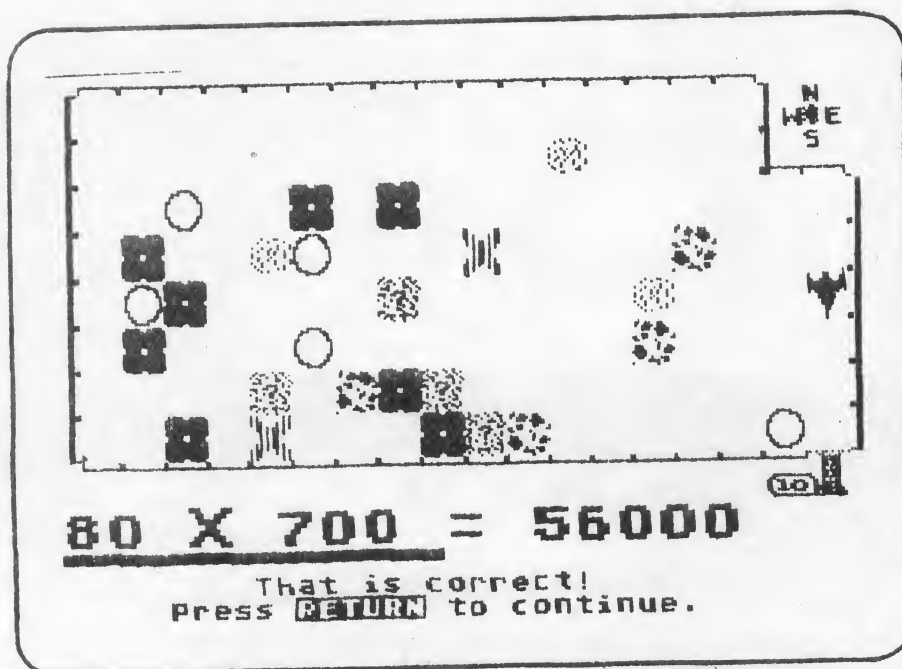


The problems may involve multiplication of basic facts, multiples of ten, or decimals.

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```
You have the following choices
   1. see the file of names and scores
   2. clear the file of student names
      and scores
   3. see the current time limit and
      type of problems
   4. change the time limit and type
      of problems
   5. return to menu
What number would you like? █
```

The teacher option allows the teacher to delete the list of top scorers that is shown at the end of the program or specify the type of problems and time limit.

EXAMPLES OF SCREEN OUTPUT

```
During your trip, you will find such
things as

   ◯ Black holes      ▦ Vapor clouds

   ▥ Danger zones     ✸ Asteroids

Try to land at BASE TEN in the
least number of moves.


     Press RETURN to continue.
```

Instructions describe the obstacles the spaceship might encounter. Many students intentionally encounter obstacles, thereby answering more multiplication problems.

PRACTICE IN MAKING CORRECT CHANGE_____

        Specific Topic:     Arithmetic, consumer education

                Type:     Drill and Practice

     Reading Level:     3.8 (Spache)

        Grade Level:     3-5

## DESCRIPTION...

This program provides a drill on the procedure for making change. Students are given the cost of the items purchased and the amount of money offered as payment. They determine the correct change using the smallest number of coins and bills.

## OBJECTIVES...

1.     to determine the correct change, given an amount of money offered for a purchase and the cost of the purchase (Mathematics SELO II-I-1).

2.     to practice proper money-handling techniques.

## BACKGROUND INFORMATION...

The CHANGE program provides practice in making change using the least number of coins and bills, when the cost of the item being purchased and the amount given to pay for that item are given. The computer randomly generates the cost of an item and the amount of cash presented for payment. The correct answer is based on returning change to a customer using the smallest number of coins and/or bills.

Students should be taught to "count back" a customer's change when entering the number of pennies, nickels, dimes, etc. (Students should be discouraged from subtracting the cost of an item from the amount given to pay for it.) The "count back" method adds the value of the coins and bills being returned to the cost of the item being purchased, until the original amount of money given by the customer is reached.

The student specifies the number of problems to be worked. For each problem, the student is given the item's cost, the amount of payment, and a graphic of a cash register change drawer. The number of pennies, nickels, dimes, quarters, fifty-cent pieces, $1 bills, $2 bills, $5 bills, $10 bills, and $20 bills used in returning the customer's change are entered by the student. The highest denomination used in this program is $20 bills.

Beginning with the pennies box, the student enters the number of that coin needed and presses RETURN. This procedure is repeated for each successive type of coin or bill. The student may skip over boxes in the change drawer by pressing the left arrow key, which automatically places a zero in that box.

If the answer is correct, the computer will give the student a positive response. If the answer is incorrect, the student decides whether to try the problem again or see the correct answer. The student may try again as many times as desired.

If the answer is correct, but there is a more efficient way of distributing coins, this will be stated. Then the student may try again or see a better answer. Change should be returned using the fewest coins and dollar bills. An exception to using the least number of coins is the use of the fifty-cent piece. Because fifty-cent pieces are not always available today, students may use either a fifty-cent piece or two quarters in returning change. The program assumes that there is an unlimited number of each type of coin or bill in the change drawer.

## USE IN AN INSTRUCTIONAL SETTING...

### Preparation

The students need to know the monetary value of coins, e.g. dimes, nickels, quarters. They need to know the number of each type of coin which equals a dollar.

The correct method of making change, counting from the amount of the purchase up to the amount given for payment, should be explained and demonstrated. Handout 2 - Steps In Making Change can be used in this discussion. Be certain students understand the concept of closest multiple of a number. For example, beginning from 27¢, the closest multiple of 5¢ is 30¢.

### Using the Program

Demonstrate the use of the program to the class by doing one or two problems together. Handout 3 - CHANGE Worksheet can be used to introduce the program to the class if a large-screen television is not available to demonstrate the program. Students can write in the boxes just as they will type answers into the computer. Students may need to be reminded to type in the number of the coins, not their value, e.g., 2 dimes, not 20¢. Point out that students can change their answers as many times as they wish. The program lets students change the number of coins or bills selected. Have students to use the program individually or in pairs.

### Follow-up

1. Discuss alternate methods of giving change other than the one presented in CHANGE. Discuss the advantages and disadvantages of each.

2. Have students report on the monetary systems of other countries.

3. Visit a local bank or have the class "numismatists" display and discuss their coin collections.

4. Start a "store" in the classroom for students to role play clerk and customer.

5. Discuss the implications of cash registers that automatically tell the cashier the correct change for each transaction and those that automatically give the coins to the customer. Is there still a need to be able to make change by hand? Does the machine figure out the change the same way a person does?

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# STEPS IN MAKING CHANGE

General Rule:   Start with the cost of
                the item and count
                up to the amount
                presented for pay-
                ment.

Reminder:  In making change, try to
           return the smallest number
           of coins and bills.

---

Example:   The cost of an item is $.32
           and the amount presented
           for payment in $10.
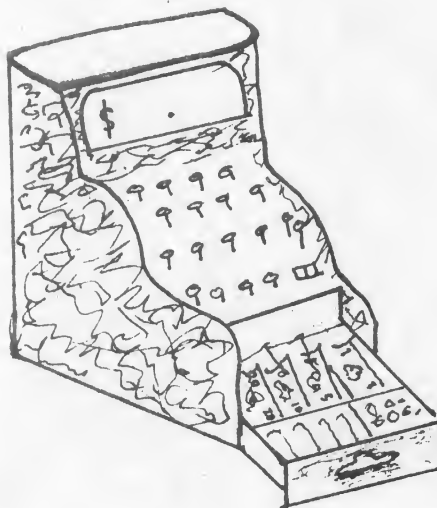
( 1¢ )    ( 5¢ )    ( 10¢ )    <u>Coins</u>

1. How many <u>pennies</u> are needed to get to the closest multiple of $.05?____

2. How many <u>coins</u> are needed to get to the closest multiple of $.25?_____

3. What is needed to get to the closest dollar?_____

( 25¢ )    ( 50¢ )    <u>Bills</u>

4. How many $1 bills?  (No more than 4) _____

5. How many $5 bills?  (0 or 1)      _____

6. How many $10 bills?  (0 or 1)     _____

7. How many $20 bills?               _____
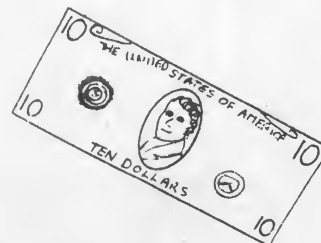
Reminder:  Use the smallest possible number of coins and bills.

# CHANGE WORKSHEET

1. $ 8.43 is the cost of the item.

   $10.00 is the amount given to pay for this purchase.

2. $3.07 is the cost of the item.

   $5.00 is the amount given to pay for this purchase.

| $20 | $10 | $5 | $2 | $1 |
|-----|-----|-----|-----|-----|
| 50¢ | 25¢ | 10¢ | 5¢ | 1¢ |

Make The Correct Change

Write the <u>number</u> of each kind of coin or bill in the boxes of the cash register shown above.

```
This program helps you practice
making correct change.

Pretend you are a check-out clerk
in a store.

You will be shown:
-The cost of the items purchased.
-The money given to pay for them.



        Press RETURN to continue.
```

The student is asked to role play a cashier in a store.

EXAMPLES OF SCREEN OUTPUT

```
$20.07 is the cost of the item.
$25.07 is the amount given to pay
        for this purchase.
```

| $20 | $10 | $5 | $2 | $1 |
|-----|-----|-----|-----|-----|
| 50¢ | 25¢ | 10¢ | ?<br>5¢ | 0<br>1¢ |

```
      Make the correct change.

How many NICKELS?
```

The screen displays a cash register change drawer and randomly selected purchase price and amount offered in payment. The program then asks for the number of coins and bills needed to make change, beginning with pennies.

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ESTIMATE

ESTIMATING ANSWERS TO PROBLEMS_____

     Specific Topic:    Estimation

           Type:    Drill and Practice

    Reading Level:    3.7 (Spache)

     Grade Level:    4-6

## DESCRIPTION...

This drill program is designed to improve student ability to estimate answers to arithmetic exercises. Students select from addition, subtraction, multiplication, division or percent problems and also determine the level of problem difficulty. The drills are timed.

## OBJECTIVES...

1.    to compute with whole numbers less than 10,000 (Mathematics SELO II-A-1).

2.    to estimate answers to arithmetic exercises.

3.    to estimate answers quickly.

4.    to calculate the approximate percentage of numbers.

5.    to estimate the result of an arithmetic problem within one order of magnitude (Mathematics SELO II-C-2).

6.    to recognize the difference between estimated results and a computed result (Mathematics SELO I-C-1).

## BACKGROUND INFORMATION...

This program drills on arithmetic estimating skills.   Five drills are available. Within each drill, students can select the difficulty of the problems, the time allotted to enter the answer, and the number of problems.

<u>Drills</u> <u>and</u> <u>Corresponding</u> <u>Types</u> <u>of</u> <u>Problems</u>
($\approx$ means "approximately equal to")

ADDITION

|   |   |   |
|---|---|---|
| a. | 2-digit plus 2-digit | e.g.  $21 + 48 \approx 21 + 50$ or 71 |
| b. | 3-digit plus 3-digit | e.g.  $379 + 421 \approx 379 + 400$ or 779 |
| c. | 4-digit plus 4-digit | e.g.  $4820 + 1234 \approx 4820 + 1000$ or 5820 |
| d. | mixture of all three | |

SUBTRACTION

|   |   |   |
|---|---|---|
| a. | 2-digit minus 2-digit | e.g.  $59 - 31 \approx 59 - 30$ or 29 |
| b. | 3-digit minus 2- or 3-digit | e.g.  $371 - 59 \approx 371 - 60$ or 311 |
| c. | 4-digit minus 3- or 4-digit | e.g.  $7805 - 671 \approx 7805 - 700$ or 7105 |
| d. | mixture of all three | |

MULTIPLICATION

|   |   |   |
|---|---|---|
| a. | 1-digit times 2-digit | e.g.  $17 \times 8 \approx 160$ |
| b. | 2-digit times 2-digit with product less than 1,000 | e.g. $21 \times 36 \approx 800$ |
| c. | 2-digit times 2-digit with product greater than 1,000 | e.g. $74 \times 57 \approx 4200$ |
| d. | mixture of all three | |

DIVISION

|   |   |   |
|---|---|---|
| a. | 3-digit divided by 1-digit | e.g.  $508/4 \approx 125$ |
| b. | 3-digit divided by 2-digit with quotient less than 1,000 | e.g.  $426/71 \approx 60$ |
| c. | 4-digit divided by 2-digit with quotient greater than 1,000 | e.g.  $3936/41 \approx 100$ |
| d. | mixture of all three | |

## BACKGROUND INFORMATION (continued)

### PERCENT

a.    1, 10 and 50 percent                    e.g.  10% of 241 is about 24

b.    integer percents from 1 to 10

                                          e.g.  2% of 280 is about 6

c.    percents that are multiples of 10, 25, or 75

                                          e.g.  25% of 17 is about 4

d.    a mixture of all three

### Levels of Tolerance in Estimating

### ADDITION OR SUBTRACTION

Round the second number, then add or subtract.

a.    within 5 for the 2-digit option, e.g. if the problem was

     27
  +34    rounds to    +30 ;  the computer will accept 56 to 66.
   61                   57

b.    within 50 for the 3-digit option.

c.    within 500 for the 4-digit option.

### MULTIPLICATION

a.    round the 2-digit number and multiply times the 1-digit number.

b.    round both 2-digit numbers and multiply.

### DIVISION

a.    round the 3-digit number and divide by the 1- or 2-digit number in 3-digit problems.

b.    round the 4-digit number and divide by 2-digit in the 4-digit problems.

## USE IN AN INSTRUCTIONAL SETTING...

### Preparation

Students need to be able to round whole numbers. They also need to be able to compute with whole numbers using the operation (addition, subtraction, multiplication, or division) they have chosen.

For the percent exercises, students need to understand the concept of percent and know the procedure for computing with simple percents, e.g. 10%, 25%, 50%.

### Using the Program

Decide with the student the type of problem, the number of problems to be done, and the time allowed for each problem. Use Handout 4 - ESTIMATE Score Sheet to record these decisions. Circle the numbers the student must enter to choose the type of problems desired.

This is a timed drill. Be sure to start the student with a time allowance long enough to avoid feelings of frustration or anxiety. After the student has gained confidence in working the problems, gradually decrease the time interval to increase the speed of calculation.

Students may record their scores on the lower half of Handout 4.

### Follow-up

1.  Discuss the circumstances under which estimation is appropriate and/or necessary. When is it inappropriate or misleading?

2.  Discuss how estimation skill can be helpful in judging whether an "exact" answer to an exercise is reasonable.

3.  Hold a class tournament with teams composed of a recorder (to keep score), a timer (to watch the time limit of 5 or more minutes per group), and a typist (to enter answers into the computer). Have each group attempt 30 problems within the time limit. Group members can jointly decide on the correct answer.

## ESTIMATE SCORE SHEET

Name: _____

Time limit: _____

Number of Problems: _____

*about close to roughly*
*approximately*
*near almost*

---

### TYPE OF PROBLEMS

**1. ADDITION**

_____1. mixture

_____2. 2-digit

_____3. 3-digit

_____4. 4-digit

**2. SUBTRACTION**

_____1. mixture

_____2. 2-digit

_____3. 3-digit

_____4. 4-digit

**3. MULTIPLICATION**

_____1. 1-digit x 2-digit

_____2. 2-digit x 2-digit
      product than 1000

_____3. 2-digit x 2-digit
      product than 1000

_____4. mixture

**4. DIVISION**

_____1. 3-digit by 1-digit

_____2. 3-digit by 2-digit

_____3. 4-digit by 2-digit

_____4. mixture

**5. PERCENT**

_____1. 1, 10 and 50%

_____2. 1 - 10%

_____3. 10, 25, 75%

_____4. mixture

---

### MY SCORES

Date:_____ Number tried: _____

Number correct-first try: _____

-second try: _____

Date:_____ Number tried: _____

Number correct-first try: _____

-second try: _____

---

Date:_____ Number tried: _____

Number correct-first try: _____

-second try: _____

Date:_____ Number tried: _____

Number correct-first try: _____

-second try: _____

```
You may choose problems in
    1. addition
    2. Subtraction
    3. Multiplication
    4. division
    5. percentages

What is your choice? █
```

Students choose the drill and the number of seconds allowed.

EXAMPLES OF SCREEN OUTPUT

Students also choose the difficulty of problems.

```
You may choose the size of the
numbers.
    1. 1 digit times 2 digits
    2. 2 digits times 2 digits with the
       product less than 1000
    3. 2 digits times 2 digits with the
       product greater than 1000
    4. a mixture of all of these
What is your choice? █
```

23

```
        4 X 49

    IS ABOUT 200


    VERY GOOD!!


The exact answer is 196.

Press RETURN to continue.
```

Example of multiplication option, 1-digit x 2-digits. Students are presented with a problem. If their response is correct in the time allowed, they receive a positive response. If incorrect, they get a second try. If incorrect on the second try, they are given the correct answer.

EXAMPLES OF SCREEN OUTPUT

```
*********************************
*                               *
*    Number tried...8           *
*                               *
* Number correct                *
*                               *
*  First try......4             *
*                               *
*  Second try.....3             *
*                               *
*********************************



Press RETURN to continue.
```

At the end of the lesson students are given a summary score of how well they did. These summaries should be copied onto their score sheets.

SKILL BUILDING IN MATHEMATICS_____

|                   |                            |
|-------------------|----------------------------|
| Specific Topic:   | Basic facts, regrouping    |
| Type:             | Drill and Practice         |
| Reading Level:    | 3.3 (Spache)               |
| Grade Level:      | 2-6                        |

## DESCRIPTION...

Students participate individually or in groups in an arithmetic contest that presents random drills. The level of problem difficulty is set to be appropriate to the age and ability of the player.

## OBJECTIVES...

1.  to recall the basic facts of addition, subtraction, multiplication, and division (Mathematics SELO I-A-2).

2.  to compute with whole numbers less than 10,000 (Mathematics SELO II-A-1).

3.  to participate in a game having an equal chance to win because of compensation for age and ability level.

4.  to increase speed in calculating.

5.  to enjoy doing mathematics at ability level (Mathematics SELO V-A-3).

## BACKGROUND INFORMATION...

In MATH GAME students compete against each other in addition, subtraction, multiplication, and division problems.  Speed and accuracy determine how well they score.  Up to 35 players can compete at one time.  Players determine the number of problems to be solved from a maximum of fifty.  Students enter their names, ages and level of problem difficulty.  Each operation has nine levels. Problem difficulty is dependent on both the age and ability level, i.e., an older student asking for level 4 will receive more difficult problems than a younger student asking for level 4.  If students ask for level 1 they will always receive one-digit (basic fact) problems.

Examples of problems in MATH GAME

| Addition | level 1 | level 5 | level 9 |
|---|---|---|---|
| age 5 | 3 + 6 | 24 + 14 | 70 + 25 |
| age 8 | 7 + 5 | 31 + 26 | 47 + 46 |
| age 12 | 7 + 2 | 34 + 17 | 83 + 49 |
| age 30 | 6 + 5 | 99 + 32 | 135 + 29 |

| Subtraction | level 1 | level 5 | level 9 |
|---|---|---|---|
| age 5 | 12 - 9 | 12 - 11 | 86 - 35 |
| age 8 | 10 - 7 | 69 - 31 | 64 - 22 |
| age 12 | 14 - 8 | 35 - 21 | 74 - 50 |
| age 30 | 14 - 9 | 77 - 5 | 33 - 29 |

| Multiplication | level 1 | level 5 | level 9 |
|---|---|---|---|
| age 5 | 5 x 3 | 9 x 2 | 14 x 5 |
| age 8 | 3 x 4 | 9 x 11 | 16 x 9 |
| age 12 | 6 x 8 | 16 x 20 | 23 x 17 |
| age 30 | 7 x 3 | 45 x 48 | 64 x 75 |

| Divison | level 1 | level 5 | level 9 |
|---|---|---|---|
| age 5 | 9/3 | 24/6 | 54/6 |
| age 8 | 18/6 | 49/7 | 391/17 |
| age 12 | 24/8 | 304/16 | 432/16 |
| age 30 | 15/3 | 504/21 | 1343/17 |

Students answer problems as quickly and accurately as they can.  Scores are determined by the time taken to answer and the number of tries.  Bonus points are added according to the total time, age, level, and percentage of correct answers.  At the end of the drill the computer prints out the highest score and the name of the player(s) who earned that score.

## BACKGROUND INFORMATION (continued)

The score for each problem is a number from 0 to 50. It is determined by a formula that subtracts points for the number of seconds required to respond and for giving incorrect answers.

$$\text{SCORE} = 50 - \left( \frac{\text{number of seconds} + 30 \times \text{number incorrect} + 10.5}{2} \right)$$

The students are allowed about 30 seconds to answer before a "time is up" message is printed and they are asked to try again. The students are given three tries on each problem. If their answers are incorrect on all three tries, the score for that problem is zero.

A bonus score is calculated using another formula, which takes into account the player's age and the level of difficulty, as well as the number of correct answers.

$$\text{Bonus} = 20 \left( \text{total problems} \right) - 20 \left( \frac{\text{number of tries} - \text{total problems}}{\text{total problems}} \right) + 5(\text{difficulty level}) - \text{age}$$

## USE IN AN INSTRUCTIONAL SETTING...

### Preparation

Since this is a drill program, students should have learned the concepts and methods involved before using this game. The teacher will need to determine the appropriate level of difficulty for each individual student and record this information on Handout 5 - MATH GAME Score Sheet.

Multiplication and division problems in the greater difficulty levels may require the use of pencil and paper or calculators. For example, 17 x 35=..., in level 9 multiplication or 972/36=..., in level 9 division.

The problems are displayed in a horizontal format, and the digits of the answer must be entered in order beginning with the leftmost digit. For example, 7 + 8 =...; enter 1, then 5.

Students may need to be reminded to press RETURN immediately after entering their answers to use up as little time as possible.

### Using the Program

The top part of Handout 5 - MATH GAME Score Sheet is filled in by the teacher, and the bottom half is for students to use in recording their scores.

This program is designed for individual or group use. A group of students may play MATH GAME and keep track of their final scores on the score sheet - Handout 5. Final scores may be posted to determine an overall class champion.

### Follow-up

1.  Hold a classroom tournament with individual students or teams competing against one another.

2.  Use the level 9 problems for practice in using hand calculators. The computer generates the problems; the student keys in the numbers on the calculator, views the answer, and enters it into the computer for verification. Two students might work as a team; one at the computer keyboard, the other using the calculator. In this way students learn to use appropriate technology for arithmetic problems that are too complicated to work "in one's head."

# MATH GAME SCORE SHEET

| NAME | AGE | LEVEL |
|------|-----|-------|
| _____ | ____ | _____ |
| _____ | ____ | _____ |
| _____ | ____ | _____ |
| _____ | ____ | _____ |
| _____ | ____ | _____ |
| _____ | ____ | _____ |

## GAME 1

| NAME | BONUS | TOTAL |
|------|-------|-------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

## GAME 2

| NAME | BONUS | TOTAL |
|------|-------|-------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

## GAME 3

| NAME | BONUS | TOTAL |
|------|-------|-------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

## GAME 4

| NAME | BONUS | TOTAL |
|------|-------|-------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

```
Player # 1 JENNIFER
How old are you? 10
What level of problems do you want? ▮
      1=EASY . . . 9=HARD
```

Students enter their names, ages and difficulty levels.

EXAMPLES OF SCREEN OUTPUT

```
   You may choose problems using
      1. addition
      2. subtraction
      3. multiplication
      4. division
      5. a mixture

What is your choice? ▮
```

Students choose problems from addition, subtraction, multiplication, division, or a random mixture.

```
ROUND # 1 JENNIFER


8 + 4 =.....? 12        Correct!!




Score on this problem: 42
               Total: 42


Press RETURN to continue.
```

The computer keeps score according to the difficulty of the problem and the speed with which the student answered it.

EXAMPLES OF SCREEN OUTPUT

```
     Individual scores:

 Name          Bonus       Total
JENNIFER        91          291
DAVID           81          239
SUE             73          218
STEVE           75          205








   Press RETURN to continue.
```

At the end of the round, scores are given. These may be copied onto the score sheet.

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## ROUNDING OFF NUMBERS_____

      Specific Topic:    Rounding, estimating

             Type:    Drill and Practice

    Reading Level:    2.7 (Spache)

      Grade Level:    4-6

### DESCRIPTION...

This program provides a drill on the procedure of rounding numbers. The number must be rounded to the nearest ten, nearest hundred, or nearest thousand.

### OBJECTIVE...

to round whole numbers to the nearest 10, 100, 1000 (Mathematics SELO V-C-1).

## BACKGROUND INFORMATION...

Students choose to practice rounding to tens, hundreds, or thousands, or to have a random mixture of these problems. They specify the number (1-99) of problems they will work. Numbers in the thousands must be rounded to the nearest thousand, numbers in the hundreds to the nearest hundred, and numbers in the tens to the nearest ten.

At the end of each session the computer informs the students of the number correct on the first try and the number correct on the second try. This drill is not timed.

If the answer is incorrect, the student is told whether it is too large or too small and is asked to try again. For example, given the number 734 and instructions to round to the nearest hundred, if the student's response is 730, the message "too large, try again" appears. If the second response is also incorrect, the program gives the answer.

The rule used when numbers are halfway between the two rounded numbers is to round up, e.g., 55 rounds to 60, 250 rounds to 300.

## USE IN AN INSTRUCTIONAL SETTING...

### Preparation

Students need to understand the concept of rounding numbers. They need to be able to identify place value names in the decimal number system (tens, hundreds, etc.) and to read whole numbers less than 10,000.

A discussion of the benefits of rounding numbers could provide motivation. Situations in which rounded numbers are useful or even essential might be listed, for example, determining the reasonableness of results, checking calculator work, or estimating the total amount of purchases.

### Using the Program

Decide with the student the type and number of problems to be done. Record this information on Handout 6 – ROUND Score Sheet. The students can also record their scores on the score sheet. Students might work individually or in pairs, taking turns at the keyboard.

### Follow-up

1.    Use the program ESTIMATE, which combines rounding skills with computation.

2.    Discuss situations in which rounded numbers are necessary or useful. Examples might include population figures, the distance to the sun, and federal budget figures. Rounded numbers are often used on graphs.

3.    What kinds of numbers can not be rounded? Examples might include phone numbers, various identification numbers, prices and scientific data.

4.    How can one decide whether a number has been rounded? Discuss the small probability of the population being exactly 10,000, for example. Is a person exactly 10 years old for very much of the time?

34

# ROUND SCORE SHEET

Name _____

Problem Type:  Tens
                Hundreds
                Thousands
                Mixture

Number of Problems  _____

Number Correct
    First Try        _____
    Second Try    _____

---

Problem Type:  Tens
                Hundreds
                Thousands
                Mixture

Number of Problems  _____

Number Correct
    First Try        _____
    Second Try    _____

---

Problem Type:  Tens
                Hundreds
                Thousands
                Mixture

Number of Problems  _____

Number Correct
    First Try        _____
    Second Try    _____

---

Problem Type:  Tens
                Hundreds
                Thousands
                Mixture

Number of Problems  _____

Number Correct
    First Try        _____
    Second Try    _____

---

Problem Type:  Tens
                Hundreds
                Thousands
                Mixture

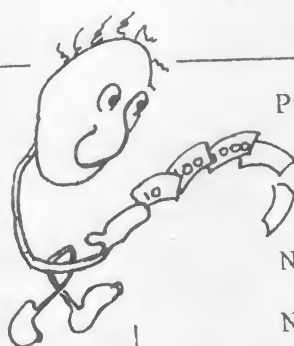Number of Problems  _____

Number Correct
    First Try        _____
    Second Try    _____

---

Problem Type:  Tens
                Hundreds
                Thousands
                Mixture

Number of Problems  _____

Number Correct
    First Try        _____
    Second Try    _____

```
You may choose to
     1. round to tens
     2. round to hundreds
     3. round to thousands
     4. have a random mixure
What is your choice? ■
```

Students choose to round off to tens, hundreds, or thousands, or select a random mixture.

EXAMPLES OF SCREEN OUTPUT

```
Round to the nearest hundred:



    198 rounds to 200




          Good!



Press RETURN to continue.
```

Students choose the number of problems to be presented. With each problem they have two chances to answer correctly. If the second try is incorrect, the computer supplies the best answer.

## DEVELOPING SPEED IN MATH SKILLS_____

Specific Topic:     Basic facts

Type:     Drill and Practice

Reading Level:     3.4 (Spache)

Grade Level:     2-6

## DESCRIPTION...

This program provides drills on addition, subtraction, multiplication, and division problems using whole numbers.  Students choose the operation and the number of problems.  The teacher determines the range of numbers used and the time limit.

## OBJECTIVES...

1.     to recall the basic facts of addition, subtraction, multiplication, and division (numbers 0-9) (Mathematics SELO II-A-1).

2.     to compute with whole numbers less than 10,000 (Mathematics SELO II-A-1).

3.     to improve speed of computation while maintaining accuracy.

## BACKGROUND INFORMATION...

SPEED DRILL is a drill and practice program on operations with whole numbers. Students choose addition, subtraction, multiplication or division problems and the number (1 to 30) of problems they will work.

The Teacher Option enables the instructor to specify the numbers used in SPEED DRILL exercises and the time limit for the student's response.

To use the Teacher Option, follow the steps outlined below:

a.  Be certain the diskette does <u>not</u> have a write-protect sticker. When the menu appears on the screen, type Control A (i.e., while you hold down the CTRL key, type an A). The title "Teacher Options" will appear.

b.  Select the SPEED DRILL option.

c.  Read the instructions on the screen.

d.  Make any desired changes in the addition exercises. Enter the minimum and maximum values for each of the two numbers in the exercises. Both minimums and maximums must be non-negative.

    For example:        Minimum 1 = 0, Maximum 1 = 100
                        Minimum 2 = 0, Maximum 2 = 10

    The first number would lie in the range 0-100, the second would be in the range 0-10.

    The exercises might include:

    | 55 | 79 | 12 | 7 |
    |----|----|----|----|
    | +9 | +3 | +5 | +1 |

e.  To change the length of time allowed for each response, type in a new number of seconds. Ten seconds requires a reasonably prompt response. When using a specific drill for the first time, students should be given longer to respond. Some students may need to have virtually unlimited time to respond, for example, 60 seconds.

f.  After you have made changes, you will again see the current values and may make further changes. If no changes are desired, type "No."

g.  Continue to the subtraction section, making any desired changes, then on to multiplication and division.

## BACKGROUND INFORMATION (continued)

In subtraction problems the top number is determined by Min1 and Max1, the bottom number by Min2 and Max2, i.e.,

$$\begin{array}{r} \text{NUMBER1} \\ - \underline{\text{NUMBER2.}} \end{array}$$

In division problems the divisor is determined by Min1 and Max1, the dividend by Min2 and Max2, i.e.,

$$\text{NUMBER1} \overline{)\text{NUMBER2.}}$$

h.    These changes are stored on the diskette and will remain in effect the next time the diskette is used. The only way in which different numbers or a different time limit can be specified is by using this Teacher Option again.

Examples of setting the number limits:

To drill on basic facts, set the limits for both numbers at 0-9.

To drill on two-digit addition without regrouping, use the first (top) number limits of 20-24 and second number limits of 0-5 or 10-15.

To drill on two-digit subtraction without regrouping, use first (top) number limits of 45-49 and second number limits of 0-5 or 20-25.

At the end of the program, the student's score is given, noting the number correct on the first and second tries.

## USE IN AN INSTRUCTIONAL SETTING...

### Preparation

Students must know basic arithmetic facts, understand place value and be able to apply procedures for regrouping.  This program is not a tutorial; it does not teach these concepts.

Students should be told that this is a timed drill.  The problems are presented in a vertical format.  The underlined question mark indicates which digit of the answer is to be entered first.

For example;  $\begin{array}{r} 8 \\ \times 7 \\ \hline ?? \end{array}$;          Enter 5, then 6.

In addition and multiplication problems involving basic facts, i.e., sums or products of numbers 0-9, the tens digit is entered before the ones digit. Otherwise the ones digit is entered first.

It is recommended that students have short practice sessions at the computer to familiarize themselves with the procedure for entering answers.

### Using the Program

Handout 7 - SPEED DRILL Score Sheet is provided for students to record their scores.  Teachers can use the top half of the worksheet to specify the kind of problems students are working on.

Care should be used in determining the speed of the drill for each student. Some students enjoy the challenge of "beating the clock", while others quickly become frustrated, and still others are totally unable to work under timed conditions.  Be certain that the student can achieve a reasonable level of success at the speed chosen.

It may be convenient to use separate diskettes for different levels of difficulty of this program.

Students might compete against themselves to try to improve their scores. A class tournament might be set up for a particular operation and level of difficulty.

**SPEED DRILL SCORE SHEET**

Name _____
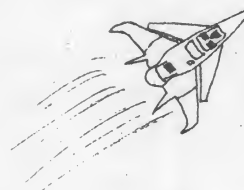
TYPES OF PROBLEMS

Addition          Subtraction          Multiplication          Division

Type of Problems: _____

Number of Problems: _____

Number correct:

        first try _____

        second try _____

Type of Problems: _____

Number of Problems:_____

Number correct:

        first try _____

        second try _____

Type of Problems: _____

Number of Problems: _____

Number correct:

        first try _____

        second try _____

Type of Problems: _____

Number of Problems:_____

Number correct:

        first try _____

        second try _____

Type of Problems: _____

Number of Problems: _____

Number correct:

        first try _____

        second try _____

Type of Problems: _____

Number of Problems:_____

Number correct:

        first try _____

        second try _____

```
You may choose problems in
    1. addition
    2. subtraction
    3. multiplication
    4. division

What is your choice? ▮
```

Students choose the type of math problem and the number of problems they will work.

EXAMPLES OF SCREEN OUTPUT

```
        41
       +15
        ??
```

Problems include addition, subtraction, multiplication and division. They are presented in a vertical format.

APPENDICES

## GETTING TO KNOW YOUR ATARI COMPUTER

### Equipment

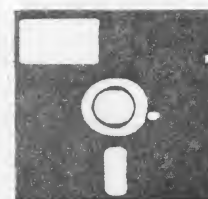ATARI COMPUTER CONSOLE:    The computer and keyboard.

BASIC LANGUAGE CARTRIDGE:    A cartridge (containing the BASIC computer language) which is inserted in the console above the keyboard.

TELEVISION:    A television set used to display information.

DISK DRIVE:    A unit that holds and reads the diskette.

DISKETTE:    A 5¼ inch 'record' that contains a series of computer programs.

### ATARI Computer Keyboard

The ATARI Computer keyboard looks much like the keyboard of a typewriter. Some special keys are noted below:

**RETURN** Key - When you are finished typing a response to a question or you are finished typing a line in a program, you send the information to the computer by pressing the **RETURN** key.

**BACK** S (Backspace) Key - Each time you press the **BACK** S key, the cursor backs up one space and erases each letter it passes over. This allows you to easily correct typographical errors.

BREAK Key - Pressing this key will stop the execution of a program. The program will remain in the computer memory, however, and may be run again. If **BREAK** doesn't work to stop the program, try **RESET** (see below).

RESET Key - Found at the top of the row of keys to the right of the keyboard. Similar in operation to the **BREAK** key. Program execution will stop. In addition, the screen will clear. To restart, type RUN"D:HELLO".

ESC (Escape) Key - While using MECC diskettes, pressing the **ESCAPE** key in response to a question will stop program execution. The users will be asked if they wish to run the program again. If not, the diskette menu is displayed and another program may then be chosen.

SHIFT Key - Used like the shift key of a typewriter. When two characters are displayed on the same key, holding down the **SHIFT** key while typing will cause the upper character to be printed. For example, holding down the SHIFT key and typing ! will print ! .

CAPS/LOWR (Capitals/Lower case) Key - After this key is pressed, the ATARI begins "typing" in lowercase letters. In order to capitalize individual letters, the shift key may be held down as with a typewriter. To switch back to all capitals, hold down the **SHIFT** key and press the **CAPS/LOWR** key again.

CTRL (Control) Key - The CONTROL key, like the **SHIFT** key, is used in conjunction with some other key. The **CONTROL** key is held down while another key is pressed.

## Keys That Can Cause Confusion

0 (ZERO) - is on the top row of keys. The letter O may not be used interchangeably with this number key.

1 (ONE) - is on the top row of keys. A lowercase L (l) is almost identical in appearance to a one. Typing a lower case L for a 1 is a common error among practiced typists.

## USING A MECC DISKETTE

1. Make certain that the ATARI Computer, BASIC language cartridge, disk drive, and TV are plugged in and connected to each other properly. (See the ATARI COMPUTER NEW USER'S GUIDE by MECC for detailed instructions.)

2. Turn on the television.

3. Turn on the disk drive. Two lights will come on (PWR ON and BUSY). After about 10 seconds the BUSY light will go off and the whirling sound will stop.

   The disk drive must be turned on before the computer is turned on.

4. Press the rectangular release button below the disk drive door and the door will open. Insert a diskette into the disk drive. (Exposed oval part is inserted first with the diskette label up.)

5. Close the door on the disk drive.

6. Turn on the ATARI Computer. The power switch is located on the right side near the power cord. The disk "BUSY" light will turn on. You will hear a whirling sound from the disk drive again.
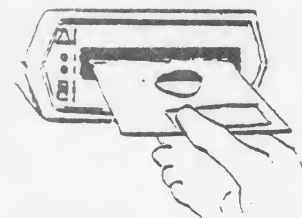
   If the disk "BUSY" light does not go off in about 10 seconds, turn the ATARI Computer off and make sure the diskette is placed correctly in the disk drive. Then turn the computer on.

   If no display appears on your TV screen at this point and the TV is set at channel 2 or 3, the computer may be set for the wrong TV channel. On an ATARI 400 Computer the channel select switch is on the rear of the computer. Switch it to the opposite position.

7. A MECC logo will appear on the screen with the diskette name. Following this, a menu will appear. The menu gives a list of programs on the diskette. To run a program, type the number shown in front of the program name, then press the RETURN key. To access any available teacher options on the diskette, hold down the CTRL key and type A.

8. Follow the directions given in the program. Remember to press the RETURN key after each answer.

9. To return to the menu while running a program, press the ESC (ESCAPE) key on the upper left hand corner of the keyboard in response to any question.

   The screen will then ask whether the current program is to be run again or not. If not, the menu is automatically displayed.

10.   To use a different diskette, select the END option from the menu and follow
      the directions on the screen.


## Turning Off The Computer

1.    Take the diskette out of the disk drive and store it in its protective envelope.

2.    Turn off the ATARI Computer, the disk drive, and TV.

Note: Diskettes are sensitive to dust, heat, cold, and magnetic fields.  Handle them
      with care.  (See the ATARI COMPUTER NEW USER'S GUIDE by MECC for
      information on diskette care.)

# DEFINITIONS OF TERMS

BACKGROUND INFORMATION - The information which explains or enriches program content or provides technical information on the program.

COURSEWARE - A collection of computer programs together with accompanying support materials.

DOCUMENTATION - The written material for the teacher to use with the computer program (also called a support booklet or support materials).

DRILL AND PRACTICE - A type of computer program which provides repetitive practice on a skill or set of facts.

EDUCATIONAL GAME - A type of computer program which presents an instructional purpose in a game format.

GRADE LEVEL - The range of grades for which the program was designed.

HANDOUTS - The pages of the support booklet which may be duplicated for student or teacher use.

MODULE - The package containing both computer programs and support booklet.

OBJECTIVES - The results to be achieved by using the program and support materials.

PROBLEM SOLVING - A type of computer program which processes data for a student defined problem.

PROGRAM - The routines and operations which instruct the computer.

READING LEVEL - The readability of the text that appears on the computer screen.

SAMPLE RUNS - The pages of the support booklet with examples of computer screen output and accompanying explanations to outline the flow of the program.

SELO - Some Essential Learner Outcomes prepared by the Minnesota State Department of Education. When applicable these are included with the objectives in MECC support booklets.

SIMULATION - A type of computer program which approximates a real-world environment for examination.

SUPPORT BOOKLET - The written material which provides the information a teacher may need to use the program in a classroom situation (also called documentation).

TEACHER AID - A type of computer program to assist a teacher with classroom management tasks.

TUTORIAL - A type of computer program which provides new information to teach a concept and may include drill and practice.

# BASIC ARITHMETIC

## CREDITS

### BASIC ARITHMETIC DISKETTE

The ATARI Computer programs in the Basic Arithmetic module were converted from MECC programs for the Apple II microcomputer in Elementary Volume 1 and Elementary Volume 4.

These programs were adapted from many sources. Some of the authors and programmers involved in their development are noted below. Programming revisions on this diskette were done by Greg Ricke, MECC. Screen layout revisions were designed by Lois Edwards, MECC.

### BASE TEN
Mike Fish, MECC, and Marge Kosel, MECC, designed and programmed BASE TEN.

### CHANGE
This program was originally written by Carol Hepper for a National Science Foundation grant at Wayne State University, Detroit, Michigan. Will Jokela added graphics and converted it for use with the Apple II. Tony Prokett, MECC, converted CHANGE to the ATARI Computer.

### ESTIMATE
Two programs by Larry Hatfield, University of Georgia, and three programs by Chuck Lund, St. Paul Schools, were combined and modified by MECC staff to create ESTIMATE for use with the Apple II. Conversion to the ATARI Computer was done by Mike Boucher.

### MATH GAME
The original program was contributed to MECC by C. Neuenshworder of Thief River Falls, Minnesota. MECC staff modified and transferred the program to the Apple II. Will Jokela, MECC, converted the program for use with the ATARI Computer.

### ROUND
This program was obtained from the University of Minnesota MERITS System. MECC staff converted the program for use with the Apple II, and Mike Boucher, MECC, converted it to the ATARI Computer.

### SPEED DRILL
This program was created by Linda Borry, MECC. Modifications for the Apple version were made by MECC staff. A teacher option was added, and the program was converted for use on the ATARI Computer by Lance Allred, MECC, and Marge Kosel, MECC.

BASIC ARITHMETIC SUPPORT MATERIAL

This manual was prepared by Lois Edwards, MECC. The content of this support booklet is in large part a revision of materials written and designed for the Apple versions of these programs by Shirley Keran, MECC. The Apple support booklet, in turn, included material from the book Elementary . . . My Dear Computer, developed by Marge Kosel and Geraldine Carlstrom for timeshare computing. Teachers from throughout the state of Minnesota contributed ideas to that effort.

## BASIC ARITHMETIC

### TECHNICAL INFORMATION

BASE TEN
| | |
|---|---|
| Main Program: | TENS |
| Chains to: | TENS2 |
| | TENS3 |
| Binary File: | TENS.FNT |
| Text File: | TENSCORE.TXT |

| | |
|---|---|
| Diskette Maintenance: | TENSCRT |
| Text File: | TENEXT.TXT |

CHANGE
| | |
|---|---|
| Main Program: | CHANGE |
| Binary File: | CENTS.FNT |

ESTIMATE
| | |
|---|---|
| Main Program: | ESTIMAT |

MATH GAME
| | |
|---|---|
| Main Program: | MATHGAM |
| Chains to: | MATHGM1 |

ROUND
| | |
|---|---|
| Main Program: | ROUND |

SPEED DRILL
| | |
|---|---|
| Main Program: | SPDRILL |
| Binary File: | SPDRILL.FNT |
| Text File: | SPDRILL.TXT |
| Teacher Option: | SPDRILLE |

# MECC INSTRUCTIONAL SERVICES ACTIVITIES

PURPOSE: The primary purpose of the Minnesota Educational Computing Consortium (MECC) is to assist users and educational member systems in coordinating and using computing resources through cooperative planning and decision making. MECC also provides current computing methods and materials.

SERVICES: All MECC activities in instructional computing are the responsibility of the Director of Instructional Services (Telephone: **612/376-1105**). Direct any questions related to MECC policy, procedures, or regulations to this office. The MECC Instructional Services Division is organized as follows:

Instructional Systems Development—This group is responsible for the production, coordination, and refinement of MECC instructional computing courseware products, computer programs, and their related user support material. Direct any questions on operations within this area to the Manager, Instructional Systems Development (Telephone: **612/376-1103**).

Technical Services—This group is responsible for operation and operating systems maintenance of the MECC Timeshare System (MTS), a 400+ port, all-purpose, multiple language computer, which serves all Minnesota public higher education institutions and 300 school districts. Technical Services also establishes and maintains the MTS telecommunications network. Direct any questions on operations within this area to the Manager, Technical Services (Telephone: **612/376-1141**).

User Services—This group is responsible for timeshare and microcomputer user communications and training and the distribution of computing equipment and MECC courseware products. A staff of instructional computing coordinators is located throughout Minnesota to promote and facilitate computer usage. Direct all questions on operations in this area to the Manager, User Services (Telephone: **612/376-1101**).

GENERAL INFORMATION: MECC provides the above information to assist individuals who wish to contact the MECC office with specific questions. Direct all written requests for information to the appropriate office at MECC, 2520 Broadway Drive, St. Paul, MN 55113. The following two items address many routine questions:

**MECC Publications and Programs Price List**
MECC distributes this free list upon request and suggests that you obtain it quarterly. Contact the MECC Publications Office (Telephone: **612/376-1118**).

**MECC USERS Newsletter**
MECC distributes this free newsletter regularly during the school year to individuals on the mailing list. Contact the User Services Office (Telephone: **612/376-1117**).

All requests for visits to MECC must be scheduled in advance by calling **612/376-1130**.

## EVALUATION SHEET

MECC encourages your comments on this manual and the accompanying diskette. User suggestions will be considered carefully and incorporated in future documentaton whenever practical.

## COMMENTS ON COMPUTER PROGRAM

Diskette Name _____     Version _____
Volume No.    _____
Program Name  _____

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## COMMENTS ON MANUAL

Title of Manual   _____
Program Name      _____
Page No.          _____

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From:       Name         _____
            Institution  _____
            Address      _____
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Please detach and mail to MECC.

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          Minnesota Educational Computing Consortium
          Manager, Instructional Systems Development
          2520 Broadway Drive
          St. Paul, MN  55113


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